Hacking the K-8 Computer Science Standards

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http://www.doe.in.gov/standards/science-computer-science
DOE Webpage -> Standards -> Science and Computer Sci.

Agenda

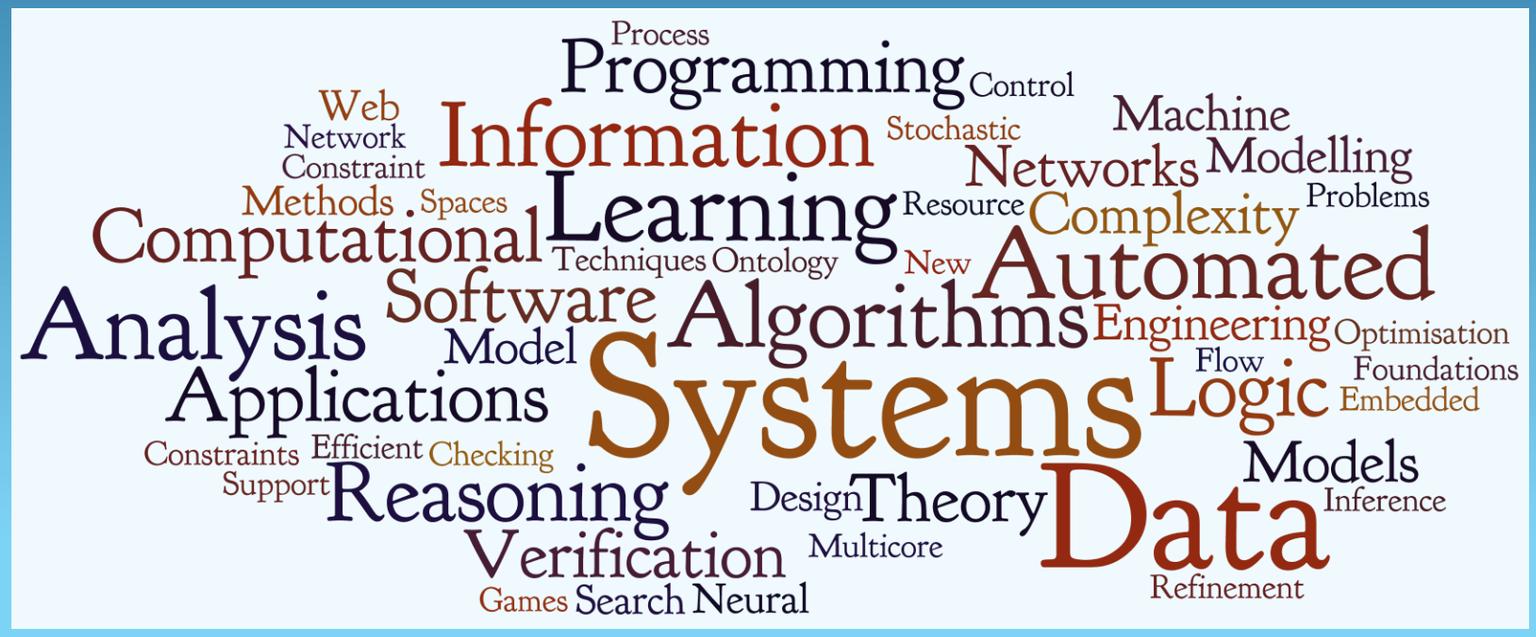
- Overview
- Implementation
- DOE’s Vision
- Resources and Professional Development
- Computer Science Strands

K-8 Science Content Standards' Strands

- Science
  - Physical
  - Earth and Space
  - Life
  - Engineering
  - Computer Science

CS Standards Make-up

- Provides inquiry-based, hands-on experiences based on two components:
  - **Concepts**
  - **Practices**



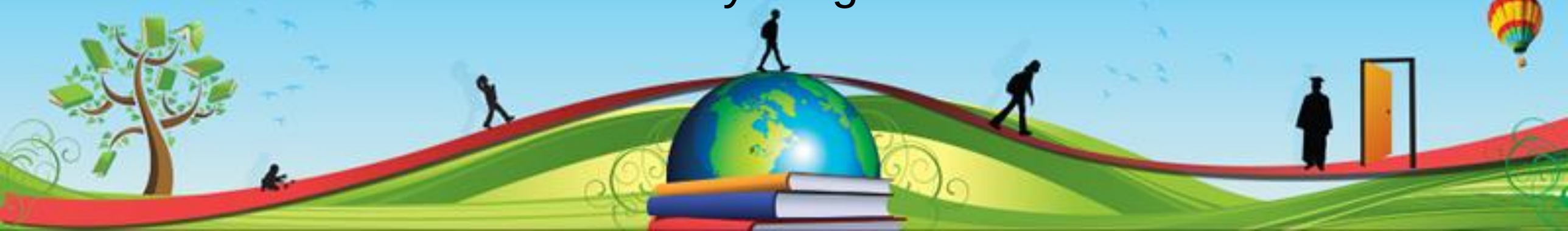
CS Grade Bands

Broken into grade bands:

- K-2
- 3-5
- 6-8

- Approach and instruct standards based on what is developmentally appropriate and age appropriate

- Collaborate with teachers in your grade band



What are the Standards NOT?

1. The standards are not curriculum.
2. The standards are not instructional practices.
3. The standards may not address students who are far below or far above grade-level.

Implementation

- Implemented in the 2016-2017 school year
- Not to be formally assessed by the State of Indiana
- Assessed locally

Computer Science Strands

- Computer Science
  - Data and Information
  - Computing Devices and Systems
  - Programs and Algorithms
  - Networking and Communication
  - Impact and Culture

DOE's Vision for Computer Science

Schools do not need to be one-to-one. In fact, many of the computer science standards can be taught without technology!

Computer Science Standards are WOVEN throughout all areas and all aspects of the day.

View them as content-area literacy standards…

- Embed computer science in ELA, math, science, social studies, music, art…

Who’s responsible for them?

All educators are responsible for the CS standards.

Our Recommendation:

Seek out a point person(s)…

- eCoach
- Computer Teacher
- Media Specialist
- Classroom Teacher
- Special Education Teacher

Anybody willing to step up
to learn and build content knowledge on the standards
can be a point person…

Professional Development and More Information

- Check the DOE calendar
  - Click “Events” on the DOE homepage
  - Tag: SCS – PD
- Learning Connection Communities
  - Elementary Math, Science, and STEM
  - IDOE – Science Educators Discussion Group
  - IDOE – Computer Science K-12

- Teachers’ Toolbox Newsletter

Website Resources

- List of websites that are matched up to each standard
- Send any links that you have to share or if you find any broken links

- Engineering and Technology
- English/Language Arts
- Family and Consumer Sciences
- Financial Literacy
- Fine Arts: Dance, Music, Theatre, Visual Arts
- Guidance
- Health and Wellness
- Health Science
- Indiana Early Learning Foundations
- Mathematics
- Physical Education
- Science & Computer Science
- Social Studies
- Special Populations of Students
- Trade and Industry
- Work Based Learning
- World Languages

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Indiana Academic Science Standards

[redacted] list the standards for each grade or course at the high school [redacted] s focus on the following topics; physical science; earth and space [redacted] 8, there are computer science and engineering standards.

[redacted] idance and illustrates the correlations between the Indiana [redacted] d the previous standards; Indiana Academic Science [redacted] ncouraged to use this document as an instructional support

Title	Updated	2016 Standards	Correlation Guide	2010 Standards
Kindergarten	04/15/2016	PDF | Word	PDF	PDF
Grade 1	04/15/2016	PDF | Word	PDF	PDF
Grade 2	04/15/2016	PDF | Word	PDF	PDF
K-2 Computer Science	05/19/2016	PDF | Word	--	--
Grade 3	04/15/2016	PDF | Word	PDF	PDF
Grade 4	04/15/2016	PDF | Word	PDF	PDF
Grade 5	04/15/2016	PDF | Word	PDF	PDF
3-5 Computer Science	04/15/2016	PDF | Word	--	--
Grade 6	04/15/2016	PDF | Word	PDF	PDF
Grade 7	04/15/2016	PDF | Word	PDF	PDF
Grade 8	04/15/2016	PDF | Word	PDF	PDF
6-8 Computer Science	04/15/2016	PDF | Word	--	--

- Physical Education
- Science & Computer Science
- Social Studies
- Special Populations of Students
- Trade and Industry
- Work Based Learning
- World Languages

Data and Information	
Indiana Academic Standard	**Activities/Labs/Simulations (Examples and Ideas)**
6-8.DI.1 Use the basic steps in algorithmic problem-solving to design solutions (e.g., problem statement and exploration, examination of sample instances, design, implementing a solution, testing, and evaluation).	Steiner Trees Computational Thinking
6-8.DI.2 Describe the process of parallelization as it relates to problem solving.	Sorting Networks
6-8.DI.3 Represent data in a variety of ways (e.g., text, sounds, pictures, and numbers), and use different visual representations of problems, structures, and data (e.g., graphs, charts, network diagrams, flowcharts).	Tune Trace Functional Suncatchers Songwriting with Parameters
6-8.DI.4 Understand the notion of hierarchy and abstraction in computing including high-level languages, translation, instruction set, and logic circuits.	Text Compression Error Detection Human Interface Design Mad Glibs
6-8.DI.5 Demonstrate interdisciplinary applications of computational thinking and interact with content-specific models and simulations to support learning and research.	Information Theory Phylogenetics
Computing Devices and Systems	
Indiana Academic Standard	**Activities/Labs/Simulations (Examples and Ideas)**

- Engineering and Technology
- English/Language Arts
- Family and Consumer Sciences
- Financial Literacy
- Fine Arts: Dance, Music, Theatre, Visual Arts
- Guidance
- Health and Wellness
- Health Science
- Indiana Early Learning Foundations
- Mathematics
- Physical Education
- Science & Computer Science
- Social Studies
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Indiana Academic Science Standards

These documents specifically list the standards for each grade or course at the high school level. The science standards focus on the following topics; physical science; earth and space science; life science. For K-8, there are computer science and engineering standards.

This document provides guidance and illustrates the correlations between the Indiana Academic Science Standards (2016) and the previous standards; Indiana Academic Science Standards (2010). Teachers are encouraged to use this document as an instructional support tool.

Title	Updated	2016 Standards	Correlation Guide	2010 Standards
Kindergarten	04/15/2016	PDF | Word	PDF	PDF
Grade 1	04/15/2016	PDF | Word	PDF	PDF
Grade 2	04/15/2016	PDF | Word	PDF	PDF
K-2 Computer Science	05/19/2016	PDF | Word	--	--
Grade 3	04/15/2016	PDF | Word	PDF	PDF
Grade 4	04/15/2016	PDF | Word	PDF	PDF
Grade 5	04/15/2016	PDF | Word	PDF	PDF
3-5 Computer Science	04/15/2016	PDF | Word	--	--
Grade 6	04/15/2016	PDF | Word	PDF	PDF
Grade 7	04/15/2016	PDF | Word	PDF	PDF
Grade 8	04/15/2016	PDF | Word	PDF	PDF
6-8 Computer Science	04/15/2016	PDF | Word	--	--

Resource Guides

- **<u>Clarifying Statements</u>** – breaks down the standard to provide clarity of what the standard encompasses (not a list of must teach)

- **<u>Vocabulary</u>** – provides examples of words that are key to understanding the standard

Living Document

It will be updated through the implementation process…

IMAGINING the possibilities. MAKING THEM HAPPEN.
Indiana Department of Education
Glenda Ritz, NBCT
Indiana Superintendent of Public Instruction

Science Standards Resource Guides

These resource guides for the standards are provided for each grade level or course at the high school level. The resource guides highlight academic vocabulary, contain clarifying statements, and list potential digital resources for each standard at the grade level or course. These documents were written by teachers for teachers. The resource guides are not exhaustive and are only for support and possible resources/activities that relate to the standards.

Title	Updated	Download
Kindergarten	06/14/2016	PDF | Word
Grade 1	06/14/2016	PDF | Word
Grade 2	06/14/2016	PDF | Word
K-2 Computer Science	--	--
Grade 3	06/14/2016	PDF | Word
Grade 4	06/14/2016	PDF | Word
Grade 5	06/14/2016	PDF | Word
3-5 Computer Science	--	--
Grade 6	06/14/2016	PDF | Word
Grade 7	06/14/2016	PDF | Word
Grade 8	06/14/2016	PDF | Word
6-8 Computer Science	--	--
Biology	06/03/2016	PDF | Word
Chemistry	06/03/2016	PDF | Word

Breaking Down the Standards

Open up a grade band and look for anything that jumps out at you.

Strand 1:
Data and Information

K-2.DI.1 Use technology resources to solve age-appropriate problems and communicate thoughts, ideas, or stories in a step-by-step manner.

3-5.DI.1 Understand and use the basic steps in algorithmic problem solving (e.g., problem statement and exploration, examination of sample instances, design, implementation, and testing).

6-8.DI.1 Use the basic steps in algorithmic problem-solving to design solutions (e.g., problem statement and exploration, examination of sample instances, design, implementing a solution, testing, and evaluation).

Strand 2:
Computing Devices and Systems

K-2.CD.1 Use standard input and output devices to operate computers and other technologies.

3-5.CD.1 Demonstrate proficiency with keyboards and other input and output devices.

6-8.CD.1 Demonstrate an understanding of the relationship between hardware and software.

Strand 3:
Programs and Algorithms

K-2.PA.1 Use technology and developmentally appropriate multimedia resources to conduct age-appropriate research and support learning across the curriculum.

3-5.PA.1 Use technology for problem-solving and self-directed learning, and general-purpose productivity tools and peripherals to support personal productivity, remediate skill deficits, facilitate learning, and individual/collaborative writing, communication, and publishing activities.

6-8.PA.1 Select appropriate tools and technology resources to support learning and personal productivity, publish individual products, and design, develop, and publish data, accomplish a variety of tasks, and solve problems.

Strand 4:
Networking and Communication

K-2.NC.1 Use technology to work cooperatively and collaboratively with peers, teachers, and others.

3-5.NC.1 Use online resources to participate in collaborative problem-solving activities for the purpose of developing solutions or products.

6-8.NC.1 Collaboratively design, develop, publish, and present products using technology resources that demonstrate and communicate curriculum concepts.

Strand 5:
Impact and Culture

K-2.IC.1 Practice responsible digital citizenship (legal and ethical behaviors) in the use of technology.

3-5.IC.1 Discuss basic issues related to responsible use of technology and information, and the consequences of inappropriate use.

6-8.IC.1 Exhibit legal and ethical behaviors when using technology and information and discuss the consequences of misuse.


QUESTIONS?
COMMENTS?
CONCERNS?

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